Kilopower Small Fission Technology (KP)

Completed Technology Project (2014 - 2018)

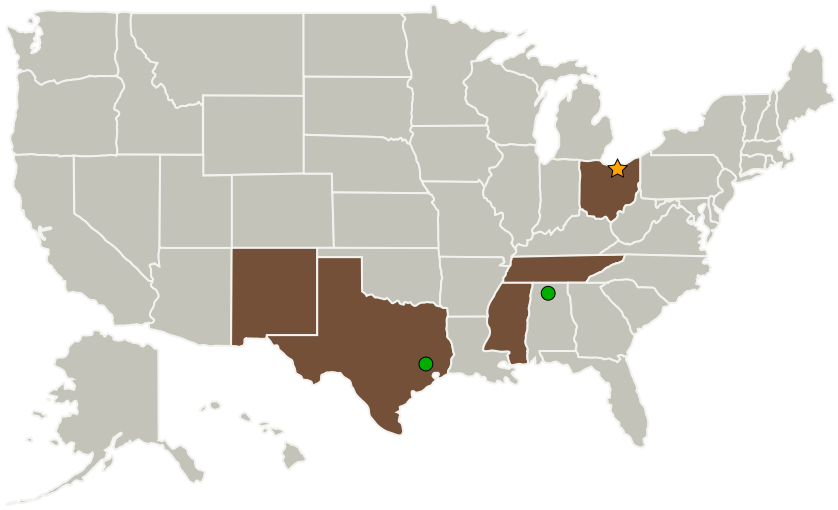
Project Introduction

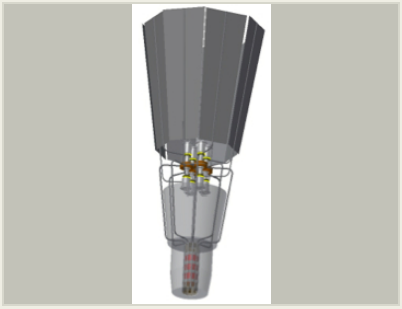
The Nuclear Systems Kilopower Project will demonstrate fission power subsystem technology readiness in a relevant environment for 1-10 kWe for robotic science and human exploration systems.

Anticipated Benefits

Benefits to NASA Funded Missions: Reduces NASA dependence on Pu238 Enables SMD Decadal Survey Missions Provides Modular Option for HEOMD Mars Surface Missions. Benefits to NASA Unfunded & Planned Missions: Reduces NASA dependence on Pu238 Enables SMD Decadal Survey Missions Provides Modular Option for HEOMD Mars Surface Missions. Benefits to Other Government Agencies: Reduces NASA dependence on Pu238 Enables SMD Decadal Survey Missions Provides Modular Option for HEOMD Mars Surface Missions. Benefits to the Commercial Space Industry: Reduces NASA dependence on Pu238 Enables SMD Decadal Survey Missions Provides Modular Option for HEOMD Mars Surface Missions. Benefits to the Nation: Reduces NASA dependence on Pu238 Enables SMD Decadal Survey Missions Provides Modular Option for HEOMD Mars Surface Missions

Primary U.S. Work Locations and Key Partners





Kilopower Small Fission Power Systems

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Organizations Performing Work	Role	Type	Location
★Glenn Research Center(GRC)	Lead Organization	NASA Center	Cleveland, Ohio
Advanced Cooling Technologies, Inc.	Supporting Organization	Industry	Lancaster, Pennsylvania
●Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas
Los Alamos National Laboratory(LANL)	Supporting Organization	R&D Center	Los Alamos, New Mexico
●Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama
Ohio State University-Main Campus	Supporting Organization	Academia	Columbus, Ohio
Sunpower, Inc.	Supporting Organization	Industry	Athens, Ohio
Y-12 National Security Complex (DoE)	Supporting Organization	US Government	Oak Ridge, Tennessee

Co-Funding Partners	Type	Location
SBIR/STTR	NASA Program	

Primary U.S. Work Locations	
Mississippi	New Mexico
Ohio	Tennessee
Texas	

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Center / Facility:
Glenn Research Center (GRC)

Responsible Program:
Game Changing Development

Project Management

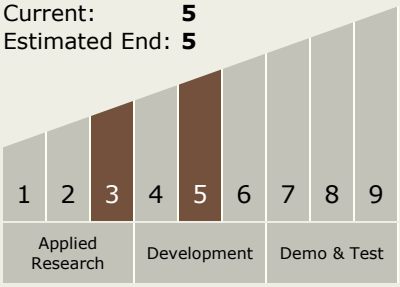
Program Director:
Mary J Werkheiser

Program Manager:
Gary F Meyering

Principal Investigator:
Dionne M Hernandez-lugo

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



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Project Transitions

July 2014: Project Start

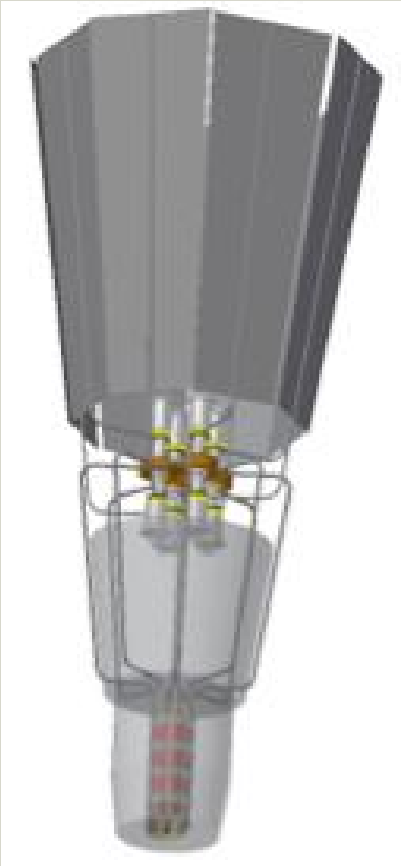
October 2018: Closed out

Closeout Summary: Starting with a study commissioned by the Decadal Surve y Giant Planets Panel (GPP) and the NASA Science Mission Directorate in 2010, NASA and the Department of Energy (DOE) have conducted investigations of the feasibility of a small fission power system for science and human exploration ne eds. In 2012 the completion of the proof of concept Demonstration Using Flattop Fission (DUFF) nuclear test gave NASA confidence that performing nuclear groun d testing could be done affordably when partnering with the National Nuclear Se curity Administration (NNSA) and using their existing facilities. The DUFF experi ment integrated the existing Flattop experimental fission reactor with a heat pip e that transferred fission-generated heat to a pair of small Stirling engines suppl ied by the NASA RPS Program. This bench-top, proof of concept experiment of a small fission power system established that a small team of experts could plan, develop, and test a small fission power system in existing facilities in less than s ix months. This established a basis for the formulation of the Kilopower technolo gy development and demonstration project to build and demonstrate a flight-lik e system operated at prototypic conditions in a relevant environment (Technolo gy Readiness Level (TRL) 5) for space science and human exploration power nee ds.

Target Destinations

The Moon, Mars, Others Inside the Solar System

Images



Kilopower Small Fission Power Systems
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(https://techport.nasa.gov/image/143228)

Project Website:

https://www.nasa.gov/directorates/spacetech/game_changing_development/index.html